Hot Topic Session:
Optimization and Control of Communication Networks
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Recently, there has been a surge in research activities that utilize the power of recent developments in nonlinear optimization to tackle a wide scope of work in the analysis and design of communication systems, touching every layer of the layered network architecture, and resulting in both intellectual and practical impacts significantly beyond the earlier frameworks. These research activities are driven by both new demands in the areas of communications and networking, and new tools emerging from optimization theory. Such tools include new developments of powerful theories and highly efficient computational algorithms for nonlinear convex optimization, as well as global solution methods and relaxation techniques for nonconvex optimization.

Optimization theory can be used to analyze, interpret, or design a communication system, for both forward-engineering and reverse-engineering. Over the last few years, it has been successfully applied to a wide range of communication systems, from the high speed Internet core to wireless networks, from coding and equalization to broadband access, and from information theory to network topology models. Some of the theoretical advances have also been put into practice and started making visible impacts, including new versions of TCP congestion control, power control and scheduling algorithms in wireless networks, and spectrum management in DSL broadband access networks.

Under the theme of optimization and control of communication networks, this Hot Topic Session consists of five invited talks covering a wide range of issues, including protocols, pricing, resource allocation, cross layer design, traffic engineering in the Internet, optical transport networks, and wireless networks.